AMENDMENTS TO THE CLAIMS

The following claims replace any previous version of the claims.

1. **(Withdrawn)** An atomic layer deposition apparatus for growing thin films on a substrate configured to expose the substrate to alternate surface reactions of vapor-phase reactants, the apparatus comprising:

a plurality of chamber walls defining a process chamber;

one or more inlet channels, for feeding the reactants into the chamber;

one or more outlet channels for exhausting gaseous reaction byproducts and excess reactants from the chamber;

a substrate support to support the substrate inside the chamber during processing;

a first temperature regulating system to maintain the substrate at a desired substrate temperature while supported on the substrate support;

a second temperature regulating system, to maintain the chamber walls at a desired wall temperature;

wherein the first and second temperature regulating systems are independently controllable.

2. **(Withdrawn)** The apparatus of Claim 1, wherein the first temperature regulating system heats the substrate support.

3. **(Withdrawn)** The apparatus of Claim 1, wherein the first temperature regulating system cools the substrate support.

4. **(Withdrawn)** The apparatus of Claim 1, wherein the substrate support is a movable base plate for loading and unloading substrates.

5. **(Withdrawn)** The apparatus of Claim 1, wherein the second temperature regulating system heats the walls of the chamber.

6. **(Withdrawn)** The apparatus of Claim 1, wherein the second temperature regulating system cools the walls of the chamber.

7. **(Withdrawn)** The apparatus of Claim 1, wherein the first temperature control system comprises:

a first heater positioned to heat the substrate support;

a first temperature controller, providing an output signal to control the first heater; and

a first temperature sensor providing an output signal to the first temperature controller.

8. **(Withdrawn)** The apparatus of Claim 7, wherein the heater is a resistance heater.

9. **(Withdrawn)** The apparatus of Claim 7, wherein the heater is a fluid recirculating system.

10. **(Withdrawn)** The apparatus of Claim 7, wherein the heater is embedded in the substrate support.

11. **(Withdrawn)** The apparatus of Claim 7, wherein the heater is attached to the substrate support.

12. **(Withdrawn)** The apparatus of Claim 1, wherein the second temperature regulating system comprises:

a second heater positioned to heat the walls;

a second temperature controller, providing an output signal to control the second heater; and

a second temperature sensor providing an output signal to the second temperature controller.

13. **(Withdrawn)** The apparatus of Claim 12, wherein the second heater is a resistance heater.

14. **(Withdrawn)** The apparatus of Claim 12, wherein the second heater is embedded in the walls of the chamber.

15. **(Withdrawn)** The apparatus of Claim 12, wherein the second heater is attached to the walls of the chamber.

16. **(Withdrawn)** The apparatus of Claim 12, wherein the second heater is a fluid recirculating system.

17. **(Withdrawn)** The apparatus of Claim 1, wherein the first temperature regulating system comprises a fluid recirculating system.

18. **(Withdrawn)** The apparatus of Claim 17, wherein the fluid recirculating system comprises fluid channels for passing a fluid, the channels being embedded within the substrate support.

19. **(Withdrawn)** The apparatus of Claim 18, wherein the fluid channels contain a heated fluid.

20. **(Withdrawn)** The apparatus of Claim 17, wherein the fluid recirculating system heats the substrate support.

21. **(Withdrawn)** The apparatus of Claim 17, wherein the fluid recirculating system removes heat from the substrate support.

22. **(Withdrawn)** The apparatus of Claim 17, wherein the substrate support is movable relative to the walls for loading and unloading substrates.

23. **(Withdrawn)** The apparatus of Claim 1, wherein the second temperature regulating system comprises a fluid recirculating system.

24. **(Withdrawn)** The apparatus of Claim 23, wherein the fluid recirculating system comprises fluid channels embedded within the chamber walls.

25. **(Withdrawn)** The apparatus of Claim 24, wherein the fluid recirculating system additionally comprises:

heat transfer fluid;

a temperature regulator to heat or cool the fluid;

a pump to move the fluid;

a temperature controller to maintain the temperature; and

a temperature sensor providing an output signal to the temperature controller.

26. **(Withdrawn)** The apparatus of Claim 1, wherein the first and second temperature regulating systems comprise resistance heaters.

27. **(Withdrawn)** The apparatus of Claim 1, wherein the first temperature regulating system comprises a fluid recirculating system and the second temperature regulating system comprises a resistance heater.

28. **(Withdrawn)** The apparatus of Claim 27, configured to maintain the walls at a higher temperature than the substrate.

29. **(Withdrawn)** The apparatus of Claim 1, wherein the first temperature regulating system comprises two or more temperature sensors, each sensor providing an input signal to the temperature controller, wherein the temperature of different parts of the substrate support can be controlled independently.

30. **(Withdrawn)** The apparatus of Claim 1, wherein the second temperature regulating system comprises two or more temperature sensors, each sensor providing an input signal to the temperature controller, wherein the temperature of different parts of the walls of the chamber can be controlled independently.

31. **(Canceled)**

32. **(Canceled)**

33. **(Canceled)**

34. **(Canceled)**

35. **(Currently amended)** A method for growing a thin film on a substrate by exposing the substrate in a reaction chamber defined by a plurality of walls to alternate surface reactions of vapor-phase reactants, comprising:

controlling a chamber wall temperature of at least those portions of the chamber walls that are exposed to the vapor-phase reactants;

loading the substrate onto a substrate support structure inside the reaction chamber;

controlling a substrate support temperature independently of the chamber wall temperature; and

alternately and sequentially feeding at least two vapor phase reactants into the reaction chamber

wherein the substrate support temperature is maintained at a first temperature and the chamber wall temperature is maintained at a second temperature different from the substrate support temperature and, wherein a difference between the first temperature and the second temperature is selected to maintain a lower rate of <u>atomic layer deposition (ALD)</u> film growth upon the chamber walls as compared to the substrate.

36. **(Canceled)**

37. **(Previously presented)** The method of Claim 35, wherein the chamber wall temperature is maintained higher than the substrate support temperature.

38. **(Original)** The method of Claim 37, wherein the chamber wall temperature is controlled at a level low enough to prevent thermal decomposition of the reactants.

39. **(Previously presented)** The method of Claim 35, wherein the chamber wall temperature is maintained lower than the substrate support temperature.

40. **(Original)** The method of Claim 39, wherein the chamber wall temperature is controlled at a level high enough to prevent condensation of one of the reactants on the wall.

41. **(Original)** The method of Claim 39, wherein the chamber wall temperature is controlled at a level high enough to prevent physisorption of one of the reactants on the wall.

42. **(Original)** The method of Claim 39, wherein one of the reactants is water and the wall is maintained at a temperature of 200°C or higher.

43. **(Previously presented)** The method of Claim 35, wherein the chamber wall temperature is maintained higher than a temperature of the reactants as they enter the reaction chamber.

44. **(Currently amended)** A method for growing a thin film on a substrate by exposing the substrate in a reaction chamber defined by a plurality of chamber walls to alternate surface reactions of vapor-phase reactants, comprising:

loading the substrate onto a substrate support structure inside the reaction chamber;

maintaining the substrate support at a first temperature by means of a first temperature controller;

maintaining at least portions of the chamber walls that are exposed to the vapor-phase reactants at a second temperature different from the first temperature by means of a second temperature controller; and

alternately and sequentially feeding at least two vapor phase reactants into the reaction chamber;

wherein the second temperature is selected to lower a rate of atomic layer deposition (ALD) film growth upon the walls relative to the substrate.

45. **(Original)** The method of Claim 44, wherein the second temperature is maintained higher than the first temperature.

46. **(Original)** The method of Claim 45, wherein maintaining the first temperature comprises removing heat from the substrate support.

47. **(Original)** The method of Claim 46, wherein removing heat comprises circulating a fluid through the substrate support.

48. **(Original)** The method of Clam 44, wherein the second temperature is maintained lower than the first temperature.

49. **(Canceled)**

50. **(Currently amended)** A method for preventing unwanted deposition on walls of an atomic layer deposition reaction chamber, comprising controlling a temperature of a substrate and independently controlling a temperature of at least those portions of the chamber walls exposed to reactants, such that a rate of deposition by self-limited atomic layer deposition on the substrate is maximized while self-limited atomic layer deposition (ALD) film growth on the walls is reduced relative to controlling a temperature of the substrate alone.

51. **(Original)** The method of Claim 50, wherein controlling the chamber wall temperature comprises heating the chamber walls.

52. **(Original)** The method of Claim 50, wherein controlling the substrate temperature comprises heating the substrate.

53. **(Original)** The method of Claim 50, wherein controlling the wall temperature comprises maintaining the wall temperature in a range to accomplish atomic layer deposition upon the walls.

54. **(Original)** The method of Claim 50, wherein controlling the wall temperature comprises maintaining the wall temperature in a range to avoid condensation and physisorption of reactants upon the walls.

55. **(Original)** The method of Claim 54, wherein controlling the wall temperature comprises maintaining the wall temperature in a range to avoid thermal decomposition of reactants upon the walls.

56. **(Original)** The method of Claim 55, wherein controlling the wall temperature comprises maintaining the wall temperature in a range to reduce film growth rates upon the walls relative to deposition rates upon the substrate.

57. **(Previously presented)** A method for growing a thin film on a substrate by exposing the substrate in a reaction chamber defined by a plurality of walls to alternate surface reactions of vapor-phase reactants, comprising:

controlling a chamber wall temperature of at least those portions of the chamber walls that are exposed to the vapor-phase reactants;

loading the substrate onto a substrate support structure inside the reaction chamber;

controlling a temperature of the substrate independently of the chamber wall temperature;

alternately and sequentially feeding at least two vapor phase reactants into the reaction chamber; and

maintaining the temperature of the substrate within an ALD temperature window such that approximately one monolayer is deposited per full cycle and maintaining the chamber wall temperature within a temperature window that is either (i) above a lower temperature limit at which condensation takes place on the chamber walls and below the ALD temperature window or (ii) below a high temperature limit at which thermal decomposition causes deposition on the chamber walls and above the ALD temperature window.